DIVISION 2 - SITEWORK

SECTION 02250

EARTHWORK FOR STRUCTURES

PART 1 - GENERAL

1.1 SCOPE

A. Description of Work

1. Provide all labor, material and equipment for excavation and backfill for structures in accordance with the Drawings.
2. Work under this section extends to a point five (5) feet beyond the enclosing walls or foundations or appurtenances of a structure.

B. Related Work Specified Elsewhere

1. Section 02020, EROSION AND SEDIMENT CONTROL
2. Section 02110, CLEARING AND GRUBBING
3. Section 03410, PRECAST CONCRETE VAULTS AND MANHOLES.
4. Section 11310, PREFABRICATED FRP PUMP STATION

1.2 PROTECTION OF UTILITY LINES

A. During the life of the Contract, existing utility lines that are to be retained and utility lines constructed shall be protected from damage. Utility lines that are damaged by the Contractor shall be satisfactorily repaired by the Contractor at no additional cost to the Owner.

1.3 CLEARING AND GRUBBING

A. Clearing of the site is described in Section 02110, CLEARING AND GRUBBING.

1.4 TOPSOIL

A. Topsoil shall be stripped and stockpiled

PART 2 - PRODUCTS

2.1 BACKFILLING MATERIALS-GENERAL

A. In general, materials used for fill shall be foreign materials and be brought to the site from acceptable sources.

B. Present on-site materials excavated in the course of construction which are deemed suitable by the Engineer may be stored on the site for use as backfill.

C. All material, whether from the excavation or from borrow, shall be of such nature that after it has been placed and properly compacted, it will make dense, stable fill. It shall not contain vegetation, cinders, ashes, refuse, masses of roots, stones larger than size allowed in the following paragraph, or porous matter. Organic matter shall not exceed minor quantities and shall be well distributed.

PART 3 - EXECUTION

3.1 EXECUTION

A. General

1. The excavation shall conform to the dimensions and elevations indicated on the drawings and for each building and structure and shall include trenching for utility and drainage systems occurring within the enclosing walls or appurtenances of the structures, and to a point five (5) feet beyond the building line of each structure.
2. Excavation consists of removal and disposal of materials encountered when establishing required grade elevations.
3. All excavation shall be unclassified.
4. The cost of such operations, including rock removal shall be included in the lump sum price bid and no separate payment shall be made for this item.
5. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.
    a. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.

6. Excavation shall extend a sufficient distance from walls and footings for placing and removing shoring and forms, the performing of all work in the excavations, and inspection except where the concrete for walls and footings is authorized to be deposited directly against excavated surfaces.

B. Rock

1. Rock Excavation: The Contractor shall be responsible for removal and on-site disposal of rock unearthed during his excavation unless otherwise directed by the Owner. Rock is defined as boulders ½ cubic yard or more in volume, solid rock, rock ledges, and rock hard cementitious aggregate deposits.

C. Excavation Below Specified Grade

1. Where the bottom of the trench, by mistake of the Contractor, is taken out to a greater depth than specified for a given pipe bedding the trench shall be brought back to grade as follows:
2. Refilling with earth to bring the bottom of the trench to the proper grade will not be permitted.
3. This additional work and material required due to the over-excavation shall be furnished and installed by the Contractor at his expense.

D. Drainage

1. Excavation shall be performed under dry conditions.

2. The excavations and the area immediately surrounding each excavation for a distance of 25 feet, including slopes and ditches, shall be continually and effectively drained away from the excavation.

3. Suitable precautions shall be taken to prevent any erosion from undercutting previously concreted footings and slabs.

4. Excavations shall be kept free from ponding until the permanent work in the excavations has been completed and accepted, and the excavations have been completely backfilled

E. Removal of Water

1. The Contractor shall provide and maintain at all times ample means and devices with which to promptly and properly dispose of all water entering all excavations. The water shall be disposed of in accordance with the state and local erosion and sediment control ordinances and without damage to adjacent property or without being a menace to public health and convenience.

2. Dewatering of the excavation shall commence when water first appears and continue with pipe installation or the structure is complete to the extent that no damage will result from hydrostatic pressure, flotation, or other causes.

3.2 EXCAVATION NEAR EXISTING STRUCTURES AND UTILITIES

A. Conduct all excavation near pipes, conduits or other underground structures with extreme care. If manual excavation is required to locate utilities and/or underground structures, or if excavation by hand is required in the installation of any piping or other structures included in the project, no extra compensation is authorized. Protection of existing utilities and structures is the responsibility of the Contractor.

B. Excavation near structures will not be allowed closer to the structure than the depth of the excavation below the bottom of the foundation without shoring the excavation with sheathing.

C. The Contractor shall carefully protect all land monuments and property markers from disturbance and damage until an authorized agent has witnessed or otherwise referenced their locations. These monuments and/or markers shall then only be removed when authorized by the agent or Owner. Monuments and/or markers shall be reinstalled by the Contractor to the satisfaction of the property owner or agent.

3.3 PROTECTION OF EXISTING STRUCTURES

A. All existing pipes, poles, wires, fences, curbings, property-line markers, storm water management and other structures which must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from damage by the Contractor.

B. In case of damage to any structure, the Contractor shall notify the appropriate party so that proper steps may be taken to repair any and all damage done. If the owner of the structure wishes to make his own repairs, the Contractor shall reimburse the owner of the structure for all the time and materials required to make his repairs.

C. When the owners of the damaged structures do not wish to make the repairs themselves, all damages shall be repaired by the Contractor, or, if not promptly done by him, the Owner may have the repairs made at the expense of the Contractor.

D. All utility services shall be supported by suitable means so that the services shall not fail when tamping and settling occurs.

E. The Contractor shall not be compensated for any additional work involved if the utilities or underground structures cross the trench line transversely above or below the pipe.

3.4 BORROW

A. When satisfactory materials are not available in sufficient quantity from required excavation, approved materials shall be obtained from borrow areas. No separate payment will be made for furnishing and placing approved borrow material. Compensation in full is included in the lump sum price paid under this Contract.

3.5 BEDDING

A. The approved materials shall be placed in successive horizontal layers of loose material not more than 6-inches thick where compaction is by rollers or vibrators and 4-inches thick where mechanical tamping is required.

B. If sands or poorly graded gravels (either of which contain less than 15 percent passing the No. 200 sieve) are used, they shall be placed fully saturated to prevent bulking.

C. Well graded gravel shall be placed at the optimum moisture content. For all other materials each layer shall be wetted or dried by aeration to a moisture content of 2 to 4 percent above optimum.

3.6 QUICKSAND EXCAVATION

A. Where quicksand is encountered, the Contractor shall drive either tight tongue and groove wooden sheet piling or steel sheet piling to a depth which will effectually cut off the flow of sand. Well points and other methods shall be used to dewater the trench. Excavation and construction shall following as rapidly as possible thereafter. A satisfactory foundation must, however, be secured either by close tongue and groove planking held by piling or some other acceptable method. Where pipe is to be constructed through quicksand excavation, the trench shall be carried to a sufficient depth below the grade line to permit the pipe to be encased in concrete, on a 2-inch x 10-inch plank platform or cradle.

3.7 FILL

A. General

1. Fill shall be provided where required to raise the subgrade to the elevations shown.

2. No fill shall be placed until the subgrade has been checked and approved, and in no case shall fill be placed on a subgrade that is muddy, frozen, or that contains frost.

3. Each layer shall be uniformly spread, moistened, or dried by aeration when required to the proper moisture content for the required degree of compaction, and uniformly compacted by a power roller vibrator or other approved equipment.

4. The surface, presented by the completed fill shall be brought to a reasonably true and even plane, and shall be approved prior to further construction operations thereon.

B. Material

1. The material used, the maximum thickness of each layer prior to compaction, and the percent of maximum density required at optimum moisture content as determined by ASTM D-698, Standard Procter.

2. Fill material shall be free of debris, roots and organic or frozen materials.

3. Fill shall consist of granular material, where fill is required under concrete slabs and footings.

3.8 COMPACTION

A. General

1. Where sands and/or gravels are used for fill, the material shall be compacted to maximum possible density obtainable with a plate-type vibrating compactor of standard manufacture consisting of a variable speed power unit attached to a vibratory plate.

   a. The vibrator may be single or multiple type and shall provide sufficient unit pressure on the vibratory plate to obtain maximum density.

2. When the proper moisture content is obtained for all other soils, they shall be compacted to a density 95 percent of maximum density.

3. Upon completion of the subgrade, the applicable moisture density relations shall be maintained until placement of the concrete.

3.9 BACKFILLING

A. General

1. Backfilling shall be performed after the permanent work in the excavation has been inspected and approved.

2. Shoring, including sheet piling, shall be removed in a manner to avoid damage or disturbance to the work, and the excavations shall be free of forms and cleaned of trash except as otherwise indicated.

3. Each layer shall be uniformly spread, moistened or dried by aeration when required to the proper moisture content for the required degree of compaction, and uniformly compacted by hand or machine tampers or by other suitable equipment.

4. Heavy equipment for spreading and compacting backfill shall not be operated closer to the wall than a distance equal to the height of the backfill above the top of footing.

B. Material

1. The material used against the structure shall be crushed stone, sand or other approved granular material and the maximum thickness of each layer prior to compaction shall be as stated above for fill.

2. Granular material shall be used for a distance from the wall equal to the fill height above the footing or to the face of the embankment in fill areas.

3. Other backfill material shall be free of trash, roots and organic or frozen materials.

C. Backfilling

1. Backfill shall not be placed on surfaces that are muddy, frozen or contain frost.

2. Backfill shall be brought to final grade unless otherwise shown or specified, and shall be brought up evenly on each side of each wall and pipe. Care shall be exercised to avoid any wedging action or eccentric action upon or against the structure, and to avoid any disturbance or damage to the work.

3. Backfill shall be brought to a suitable elevation above grade to provide for anticipated settlement and shrinkage thereof.

4. Backfill shall not be placed against foundation walls prior to seven (7) days after completion of wall and then only after approval by the Engineer.

5. Density of the granular portion of the backfill shall not exceed 95 percent of maximum density.

3.10 GRADING

A. Areas required to be graded within 25 feet, unless otherwise shown, outside of each building and structure line shall be constructed true to grade, shall be shaped to drain, and shall be maintained free from extraneous accumulations until final inspection has been completed and the work has been accepted.

3.11 DISPOSAL OF MATERIALS

A. Remove rock, macadam and other rock like street surfacing materials that are too large for use in backfill from the work sites as the work progresses. Remove surplus materials of all types when performing final surface restoration. Do not deposit any material removed from the site on private property without written consent of the Owner which has been copied to the Engineer.

END OF SECTION